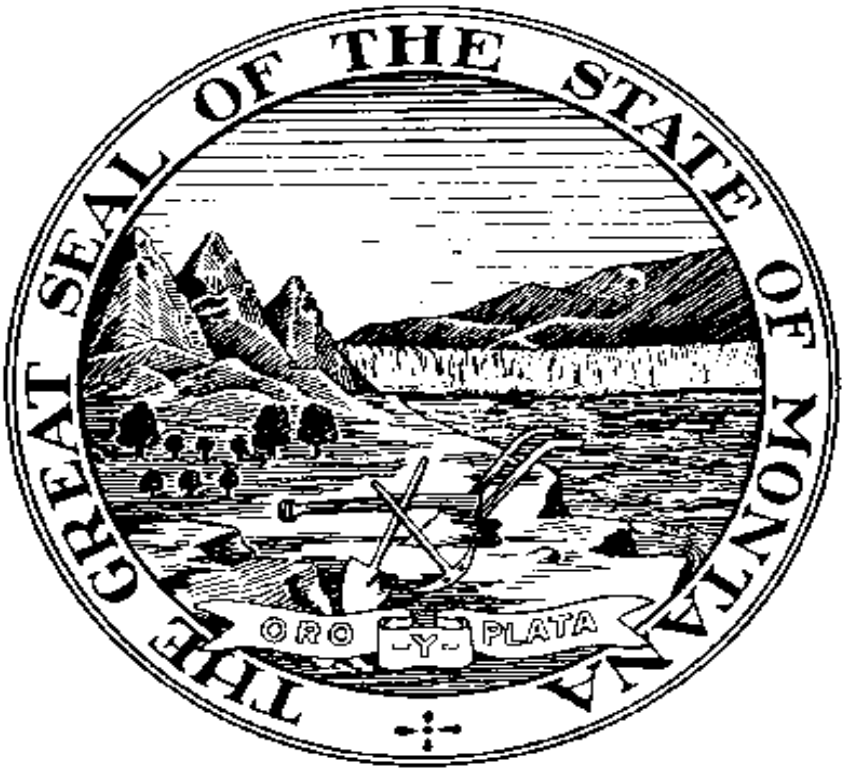
Job Safety Analysis
Identification of Hazards

Occupational Safety & Health Bureau



Montana Department of Labor & Industry

Prepared for Montana Employers
by the

Occupational Safety & Health Bureau
Department of Labor and Industry
P.O. Box 1728
Helena, Montana 59624-1728
(406) 444-6401

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Introduction

Occupational injuries and fatalities occur every day in the workplace. These injuries often occur because employees are not trained in the proper job procedure.

One way to prevent workplace injuries is to establish proper job procedures and train all employees in safer and more efficient work methods. Establishing proper job procedures is one of the benefits of conducting a Job Safety Analysis (JSA) – carefully studying and recording each step of a job, identifying existing or potential job hazards (both safety and health), and determining the best way to reduce or eliminate these hazards. A JSA is used to review job methods and uncover hazards that:

- may have been overlooked in the layout of the plant or building and in the design of the machinery, equipment, tools, workstations, and processes;
- result of changes in work procedures or personnel;
- may have developed after production has started.

When preparing a JSA the basic steps of the job are listed in the order in which they occur. For each step list all of the hazards that can occur during the job step. Also include the safe procedures that should be followed to guard against the hazards and ways to prevent potential accidents (see Appendix 1. JSA, for an example of a Job Safety Analysis).

The benefits of performing a JSA are many, including:

- giving individual training in safe and efficient work procedures;
- making employee safety contacts;
- preparing for planned safety observations;
- intrusting new worker on the job;
- giving pre-job instruction of irregular jobs;
- reviewing job procedures after accidents occur;
- studying jobs for possible improvements in job methods;
- identifying what safeguards need to be in place;
- supervisors learn about the job they supervise;
- employee participation in workplace safety;
- reduced absenteeism;
- lowered workers' compensation costs;
- increased productivity; and
- positive attitudes about safety.

I. Developing a JSA

A. Select The Job

Jobs with the worst accident history have priority and should be analyzed first. In selecting jobs to be analyzed and the order of analysis, top supervisors of a department should be guided by the following factors:

1. *Frequency of Accidents*. A job that has repeatedly caused accidents is a candidate for JSA. The greater the number of accidents associated with the job, the greater its JSA priority.

2. *Rate of Disabling Injuries*. Every job that has disabling injuries should be given a JSA.

3. Severity Potential. Some jobs may not have a history of accidents but may have the potential for a severe injury.

4. *New Jobs*. A JSA of every new job should be made as soon as possible. Analysis should not be delayed until accidents or near misses occur.

5. *Near Misses*. Jobs where near misses or close calls have occurred also should be given priority.

After the job has been selected, the three basic steps in making a JSA are:

- Break the job down into successive steps or activities.
- Identify the hazards and potential accidents.
- Develop safe job procedures to eliminate the hazards and prevent the potential accidents.

B. Break the Job Down

To do a job breakdown, select the right worker to observe. Select an experienced, capable, and cooperative worker who is willing to share ideas. Explain the purpose and the benefits of the JSA to the worker.

Observe the employee perform the job and write down the basic steps. Videotaping the job can also be used for review in the future. To determine the basic steps, ask, "What step starts the job?" Then, "What is the next basic step?" and so on.

Completely describe each step. Any deviation from the regular procedure should be recorded because it may be this irregular activity that leads to an accident.

Number the job steps consecutively in the first column of the JSA. Each step should tell what is done, not how it is done. The wording for each step should begin with an action verb like insert, open, or weld. The action is completed by naming the item to which the action applies, for example "insert board", "weld joint." Be sure to include every step of the job from beginning to end. Figure 1 shows the worker performing the basic steps for grinding iron castings.

Figure 1. Grinding Castings: Job Streps

1. Reach into metal box to right of machine, grasp casting, and carry to wheel.
2. Push casting against wheel to grind off burr.
3. Place finished casting in box to left of machine.

C. Identify Hazards and Potential Accidents

The next step in developing the JSA is the identification of all hazards involved with each step. Identify all hazards, both those produced by the environment and those connected with the job procedures. Ask yourself the following questions about each step:

- ❑ Is there a danger of striking against, being struck by, or otherwise making harmful contact with an object?
- ❑ Can the employee be caught in, by, or between objects?
- ❑ Can pushing, pulling, lifting, bending, or twisting cause strain?
- ❑ Is there a potential for a slip or trip?
- ❑ Is there a fall hazard where the worker can fall to a lower level?
- ❑ Can the worker come in contact with electrical power and become part of the electric circuit?
- ❑ Is the environment hazardous to safety and health? Are there concentrations of toxic gas, vapor, mist, fume, dust, heat, or radiation.
- ❑ Is there a danger of fire or explosion?

Close observation and knowledge of the particular job are required if the JSA is to be effective. The job observation should be repeated until the worker and observers are comfortable that all hazards and potential accidents are identified. Figure 2 shows basic job steps for gringing iron castings and any existing or potential hazards.

Figure 2. Grinding Castings: Hazards

1. Strike hand on edge of metal box or casting; cut hand on burr. Drop casting on toes.
2. Strike hand against wheel. Flying sparks, dust, chips. Not enough of wheel guarded. No dust removal systems. Sleeves could get caught in machinery. Wheel breakage.
3. Strike hand against metal box or castings.

Listed below is a list of questions that should be asked and answered when inspecting a particular machine or operation.

- ❑ Is it possible for a person to come in contact with any moving piece of machine equipment?
- ❑ Are rotating equipment, set screws, projecting keys, bolt heads, burrs, or other projections exposed where they can strike at or snag a workers' clothing or skin?
- ❑ Is it possible to be drawn into the inrunning nip point between moving parts, such as a belt and sheave, chain and sprocket, pressure rolls, rack and gear, or gear train?
- ❑ Do machines or equipment have reciprocating movement or motion where workers can be caught on or between a moving part and a fixed object?
- ❑ Is it possible for a worker's hands or arms to make contact with moving parts at the point of operation where work is being performed by the machine?
- ❑ Is it possible for material to be kicked back or ejected from the point of operation, injuring someone nearby?
- ❑ Are machine controls located and safeguarded to prevent unintended and inadvertent operation?
- ❑ Are machine controls located to provide immediate access in the event of emergency?
- ❑ Do machines vibrate, move, or walk during operation?
- ❑ Is it possible for parts to become loose during operation, injuring operators and others?

- ❑ Are guards positioned or adjusted to correspond with the permissible openings?
- ❑ Is it possible for workers to bypass the machine guard?
- ❑ Do machines, equipment, and tools receive regular maintenance?
- ❑ Do workers have sufficient room to work safely?
- ❑ Are all possible hazardous energy sources controlled during maintenance operations?
- ❑ Are energy sources heat controlled for protection?
- ❑ Is housekeeping satisfactory with no debris and tripping hazards?
- ❑ Are chemical and product spill cleaned up immediately?
- ❑ Is the operator properly using personal protective equipment (PPE)?
- ❑ Is ventilation adequate?
- ❑ Does the worker have good visibility during operation of machines or equipment?
- ❑ Is the work area well illuminated with specific point of operation lighting where necessary?
- ❑ Is the worker exposed to thermal stress during the operation?
- ❑ Are all ignition sources (static electricity, sparks, arcs, open flame, e.t.c) eliminated before using flammable liquid?
- ❑ Are flammable or combustible vapors or gases present during operation?
- ❑ Is the worker exposed to any source of electric shock or electrocution?

All of these questions can be incorporated into an inspection form that can be filled out at regular intervals. Even if the question may not apply at first it may become relevant if there is a change from the standard operating procedures. Using a checklist is a good way to be sure nothing is overlooked. Employers should develop a checklist for each operation.

D. Develop Solutions

The last step in a JSA is to develop a recommended safe job procedure to prevent occurrence of potential accidents. There are several solutions that should be considered.

Find a new way to do the job
Change the physical conditions that create the hazards
Change the work procedure
Reduce the frequency of job or task.

If a new way to do the job cannot be found then try to change the physical conditions (tools, materials, equipment, layout, or location) of the job to eliminate the hazards.

When changing the work procedure is the best solution, find out what the employee can do during the job to eliminate hazards or prevent potential accidents. The employee should be able to suggest ways to improve the safety on their worksite.

Often a repair or service job has to be frequently repeated because a condition needs correction again and again. To reduce the need of such a repetitive job find out what can be done to eliminate the cause of the condition that makes excessive repairs necessary.

Reducing frequency of a job contributes to safety only in that it limits the exposure. Every effort should still be made to eliminate hazards and to prevent potential accidents by changing physical conditions or revising job procedures or both.

List recommended safe operating procedures on the form, and also list required or recommend personal protective equipment for each step of the job. Be specific, say exactly what needs to be done to correct the hazard. If the hazard is a serious one, it should be corrected immediately. The JSA should then be changed to reflect the new condition.

Figure 3 identifies the basic job steps for grinding iron castings and recommendations for new steps and protective measures.

Figure 3. Grinding Castings: New Procedure or Protection

1. Provide gloves and safety shoes.
2. Provide larger guard over wheel. Install local exhaust system. Provide safety goggles. Instruct worker to wear short or tight-fitting sleeves.
3. Provide for removal of completed stock.

Appendix 1. Example JSA

Job Safety Analysis	**Job Title: Bander**	**Date: 00/00/00**
Company/ Organization: ABC Company	**Person Who Does Job: Bander**	**Supervisor: Department:**
Analysis By:	**Approved By:**	

Personal Protective Equipment Required:	Gloves, eye protection, long sleeves, safety boots

SEQUENCE OF BASIC JOB STEPS	POTENTIAL HAZARDS	RECOMMENDED ACTION / PROCEDURE
1. Position portable banding cart and place strapping guard on top of boxes.	1. Cart positioned too close to pallet (strike body & legs against cart or pallet, drop strapping gun on foot.)	1. Leave enough room between cart and pallet to feed strapping - have firm grip on strapping gun
2. Withdraw strapping and bend back about 3 inches.	2. Sharp edges of strapping (cut hands, fingers, & arms) Sharp corners on pallet (strike feet on corners.)	2. Wear gloves, eye protection, & long sleeves - keep firm grip on strapping - hold between thumb & forefinger.
3. Walk around load while holding strapping with one hand.	3. Projecting sharp corners on pallet (strike feet on corners).	3. Assure a clear path between pallet and cart - pull smoothly - avoid jerking strapping.
4. Pull and feed strap under pallet.	4. Splinters on pallet (punctures to hands and fingers) Sharp strap edges (cuts to hands, fingers, and arms.)	4. Wear gloves - eye protection - long sleeves. Point strap in direction of bend - pull strap smoothly to avoid jerks.
5. Walk around load. Stoop down. Bend over, grab strap, pull up to machine, straighten out strap end.	5. Protruding corners of pallet, splinters (punctures to feet and ankles).	5. Assure a clear path - watch where walking, face direction in which walking.
6. Insert, position, and tighten strap in gun.	6. Springy and sharp strapping (strike against with hands and fingers).	6. Keep firm grasp on strap and on gun - make sure clip is positioned properly.